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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,816	03/30/2004	Hiromitsu Yamakawa	25-273	2853

40615 7590 06/10/2009

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EXAMINER	
PHAM, HAI CHI	

ART UNIT	PAPER NUMBER
2861	

MAIL DATE	DELIVERY MODE
06/10/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,816	YAMAKAWA, HIROMITSU	
	Examiner	Art Unit	
	Hai C. Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☒ Claim(s) *17-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/25/09 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, 9, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (US Pat. 5,991,063) in view of Ishibe et al. (US Pat. 6,067,106 and Shimomura et al. (US Pat. 6,831,764).

Referring to claim 1, Ando teaches a laser array light source [1] in [Col. 4, lines 24-28]. Ando teaches a laser array imaging lens [7] which receives light from the laser array light source [1], the laser array imaging lens consisting of a single lens component [7] with or without a stop positioned on the image side of the single lens component [7],

with at least one surface of the single lens component being both anamorphic and aspheric in [Col. 5, Lines 1-3] shown in Fig. 1.

Ando fails to teach a diffractive optical element that is either superimposed on said at least one surface or is formed on another surface of the single lens component, said diffractive optical element being defined by a phase function.

Ishibe et al. teaches a laser array imaging lens comprising a single lens element [16] (Fig. 9), at least one surface of the single lens element [16] is both anamorphic and aspheric (the single lens element 16 is an anamorphic lens having both surfaces aspheric, i.e., the incident surface Ra of the lens is flat and thus aspheric while the light exit surface Rb of the lens is a toric surface, meaning the radius of curvature in a vertical scanning changes from an optical axis of the lens surface toward a periphery of the horizontal scanning direction) [Col. 17, Lines 28-45], and a diffractive optical element [24] that is either superimposed on said at least one surface or is formed on another surface of the single lens component [16], said diffractive optical element [24] in [Col. 7, Lines 31-36] being defined by a phase function in [Col. 9, Lines 9-20].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the single lens element of Ando with the diffractive optical element superimposed on at least one surface of the single lens element defined by a phase function as taught by Ishibe et al. in order to correct the aberration fluctuation in the sub-scanning direction that arises from environmental fluctuation as suggested by Ishibe et al. (see Ishibe et al.'s Abstract).

Ando further fails to teach the distortion of the laser array imaging lens not exceeding 2%.

Shimomura et al. teaches in Fig. 1 an image forming apparatus comprising a single imaging lens 6 having a surface that is both anamorphic and aspheric and a diffractive optical element provided on the exit surface of the single lens 6, and wherein the distortion of the imaging lens 6 does not exceed 2% (Fig. 7A).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the device of Ando with the imaging lens having a distortion less than 2% as taught by Shimomura et al. for the benefit of reducing the image line bending.

Referring to claim 5, Ando teaches a means for independently modulating the individual light emitting elements of the laser array light source [1], based on a prescribed signal in [Col. 4, Lines 24-28, and Lines 34-36] and a means for relatively moving a surface [12] to be scanned and that is positioned substantially at the image surface of the laser array imaging lens [7], in a sub-scanning direction that is roughly perpendicular to the direction [arrow B] of the imaged dots that form one or more rows at the image surface [12] in [Col. 5, Lines 3-11, and Lines 35-42] shown in Fig. 1.

Referring to claims 9, 13, Ando teaches a single lens component consisting [7] of a single lens element in [Col. 5, Lines 1-3] shown in Fig. 1.

4. Claims 3, 7, 11, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (US Pat. 5,991,063) in view of Imakawa et al. (US Pat. 5,671,077) and Shimomura et al. (US Pat. 6,831,764).

Referring to claim 3, Ando teaches a laser array light source [1] in [Col. 4, lines 24-28]. Ando teaches a laser array imaging lens [7] which receives light from the laser array light source [1], the laser array imaging lens consisting of a single lens component [7] with or without a stop positioned on the image side of the single lens component [7], with at least one surface of the single lens component being aspheric in [Col. 5, Lines 1-3] shown in Fig. 1. Ando does not teach the following condition being satisfied:

$$0.5 \prec \frac{L}{\left(D_2 \cdot \left(1 - \frac{1}{M}\right)\right)} \prec 2.0$$

where

L is the distance from the laser array light source to the light-source side of the laser array imaging lens;

D_2 is the distance along the optical axis from the image-side surface of the laser array imaging lens to the position where the centers of the beams from the laser elements of the laser array light source intersect the optical axis after being refracted by the laser array imaging lens; and

M is the image magnification.

Imakawa et al. teaches the same condition to an anamorphic and aspheric lens [21] in [Col. 15, Lines 39-44]. The lens is not the imaging lens, but the same properties

are associated with an anamorphic and aspheric lens whether it is located as an imaging lens or another lens. Imakawa et al. teaches the distance (do) as 6.667mm from the laser array light source to the light-source side of the anamorphic lens [21] in [Col. 15, Lines 65-66]. Imakawa et al. teaches the distance (d2) as 18mm along the optical axis from the second surface of the anamorphic lens to the position where the centers of the beams from the laser elements of the laser array light source intersect shown in Fig. 28A (13A is the intersection point of the centers of the beams on the optical axis) the optical axis after being refracted by the anamorphic lens [21] in [Col. 16, Lines 1-2]. Imakawa et al. teaches the image magnification (m) as 3. Therefore the following condition is met:

$$0.5 \prec \frac{6.667}{\left(18 \cdot \left(1 - \frac{1}{3}\right)\right)} \prec 2.0 \qquad \Rightarrow \qquad 0.5 \prec 0.555583 \prec 2.0$$

It would have been obvious .at the time the invention was made to a person having ordinary skill in the art to incorporate the anamorphic and aspheric lens characteristics of Imakawa et al. with the laser array imaging lens of Ando for the purpose of obtaining high performance in image formation.

Ando further fails to teach the distortion of the laser array imaging lens not exceeding 2%.

Shimomura et al. teaches in Fig. 1 an image forming apparatus comprising a single imaging lens 6 having a surface that is both anamorphic and aspheric and a

diffractive optical element provided on the exit surface of the single lens 6, and wherein the distortion of the imaging lens 6 does not exceed 2% (Fig. 7A).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the device of Ando with the imaging lens having a distortion less than 2% as taught by Shimomura et al. for the benefit of reducing the image line bending.

Referring to claim 7, Ando teaches a means for independently modulating the individual light emitting elements of the laser array light source [1], based on a prescribed signal in [Col. 4, Lines 24-28, and Lines 34-36] and a means for relatively moving a surface [12] to be scanned and that is positioned substantially at the image surface of the laser array imaging lens [7], in a sub-scanning direction that is roughly perpendicular to the direction [arrow B] of the imaged dots that form one or more rows at the image surface [12] in [Col. 5, Lines 3-1t, and Lines 35-42] shown in Fig. 1.

Referring to claims 11 and 15, Ando teaches a single lens component consisting [7] of a single lens element in [Col. 5, Lines 1-3] shown in Fig. 1.

5. Claims 2, 6, 10, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (US Pat. 5,991,063) in view of Ishibe et al. (US Pat. 6,067,106) and Shimomura et al. (US Pat. 6,831,764) as applied to claim 1 above, and further in view of Sissom et al. (US Pat. 5,912,768).

Referring to claim 2, Ando in view of Ishibe et al. and Shimomura et al. discloses the basic elements of the claimed invention except for a stop positioned on the image side of the single lens component at a specified distance.

Sissom et al. teaches a stop [54] positioned on the image side of the single lens component imaging lens [50] at a distance away from the imaging lens [50] in [Col. 4, Lines 38-39] shown in Fig. 2.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teachings of Sissom et al. with the laser array imaging lens of Ando for the purpose of having a specified working f-number.

Referring to claim 6, Ando further teaches a means for independently modulating the individual light emitting elements of the laser array light source [1], based on a prescribed signal in [Col. 4, Lines 24-28, and Lines 34-36] and a means for relatively moving a surface [12] to be scanned and that is positioned substantially at the image surface of the laser array imaging lens [7], in a sub-scanning direction that is roughly perpendicular to the direction [arrow B] of the imaged dots that form one or more rows at the image surface [12] in [Col. 5, Lines 3-11, and Lines 35-42] shown in Fig. 1.

Referring to claims 10, 14, Ando also teaches the single lens component [7] consisting of a single lens component (Fig. 1).

6. Claims 4, 8, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (US Pat. 5,991,063) in view of Imakawa et al. (US Pat.

5,671,077) and Shimomura et al. (US Pat. 6,831,764) as applied to claim 3 above, and further in view of Sissom et al. (US Pat. 5,912,768).

Ando in view of Imakawa et al. and Shimomura et al. discloses the basic elements of the claimed invention except for a stop positioned on the image side of the single lens component at a specified distance.

Sissom et al. teaches a stop [54] positioned on the image side of the single lens component imaging lens [50] at a distance away from the imaging lens [50] in [Col. 4, Lines 38-39] shown in Fig. 2.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teachings of Sissom et al. with the laser array imaging lens of Ando for the purpose of having a specified working f-number.

Referring to claim 8, Ando teaches a means for independently modulating the individual light emitting elements of the laser array light source [1], based on a prescribed signal in [Col. 4, Lines 24-28, and Lines 34-36] and a means for relatively moving a surface [12] to be scanned and that is positioned substantially at the image surface of the laser array imaging lens [7], in a sub-scanning direction that is roughly perpendicular to the direction [arrow B] of the imaged dots that form one or more rows at the image surface [12] in [Col. 5, Lines 3-11, and Lines 35-42] shown in Fig. 1.

Referring to claims 12 and 16, Ando teaches a single lens component consisting [7] of a single lens element in [Col. 5, Lines 1-3] shown in Fig. 1.

Allowable Subject Matter

7. Claims 17-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of claims 17-20 is the inclusion of the limitation “the stop is positioned so that the laser array imaging lens is substantially telecentric on the light-source side”, which is not found taught by the prior art of record considered alone or in combination.

Response to Arguments

9. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new grounds of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hai C Pham/
Primary Examiner, Art Unit 2861
June 8, 2009